PS1 PU-18 16MB RAM Mod; By Tunertom.

This document will go over the steps required to upgrade a PS1 SCPH-55xx PU-18 Motherboard model console from 2MB to 16MB of main system memory.

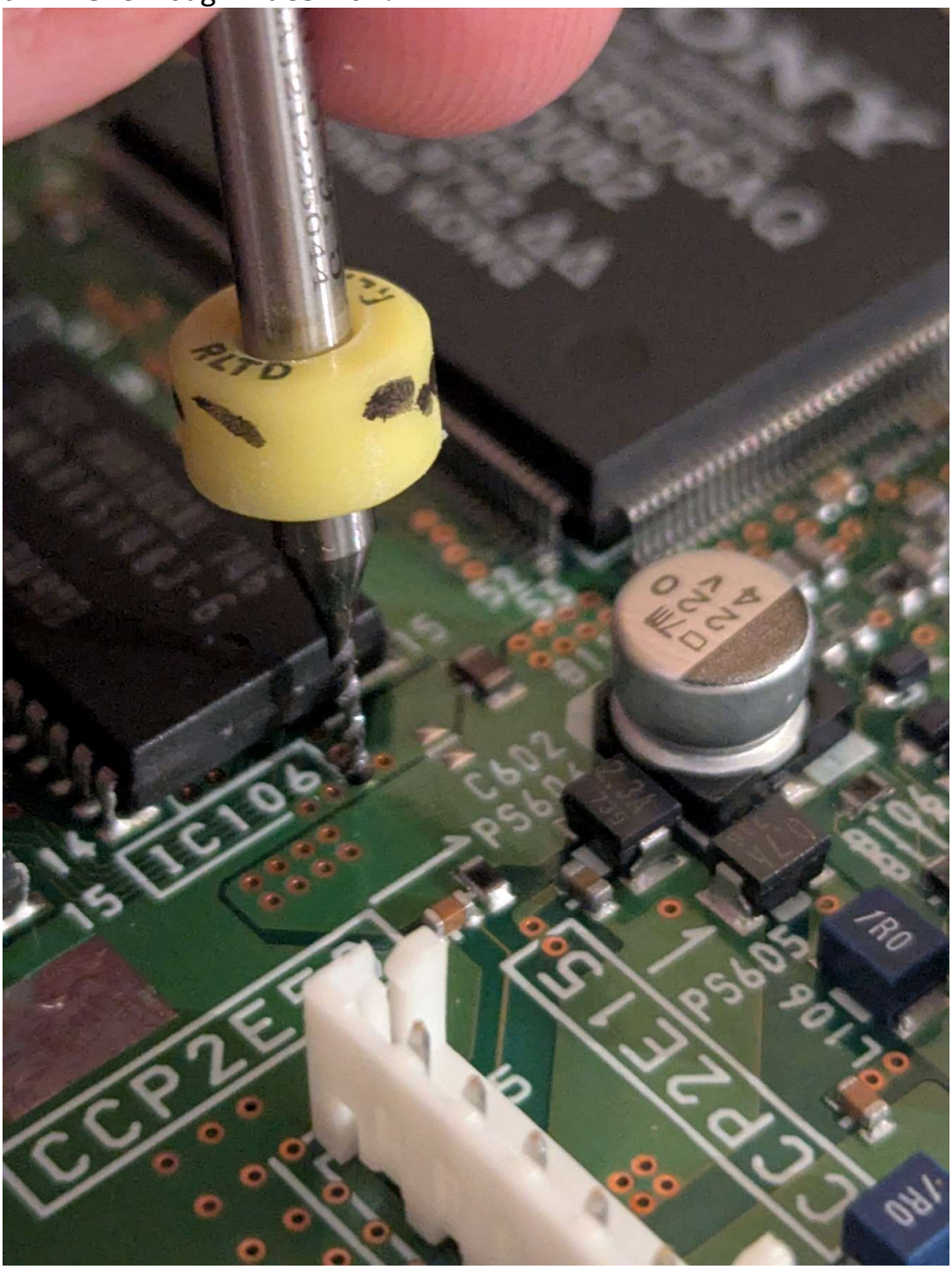
This will NOT improve performance on retail release games, only game mods or homebrew can take advantage of this mod.

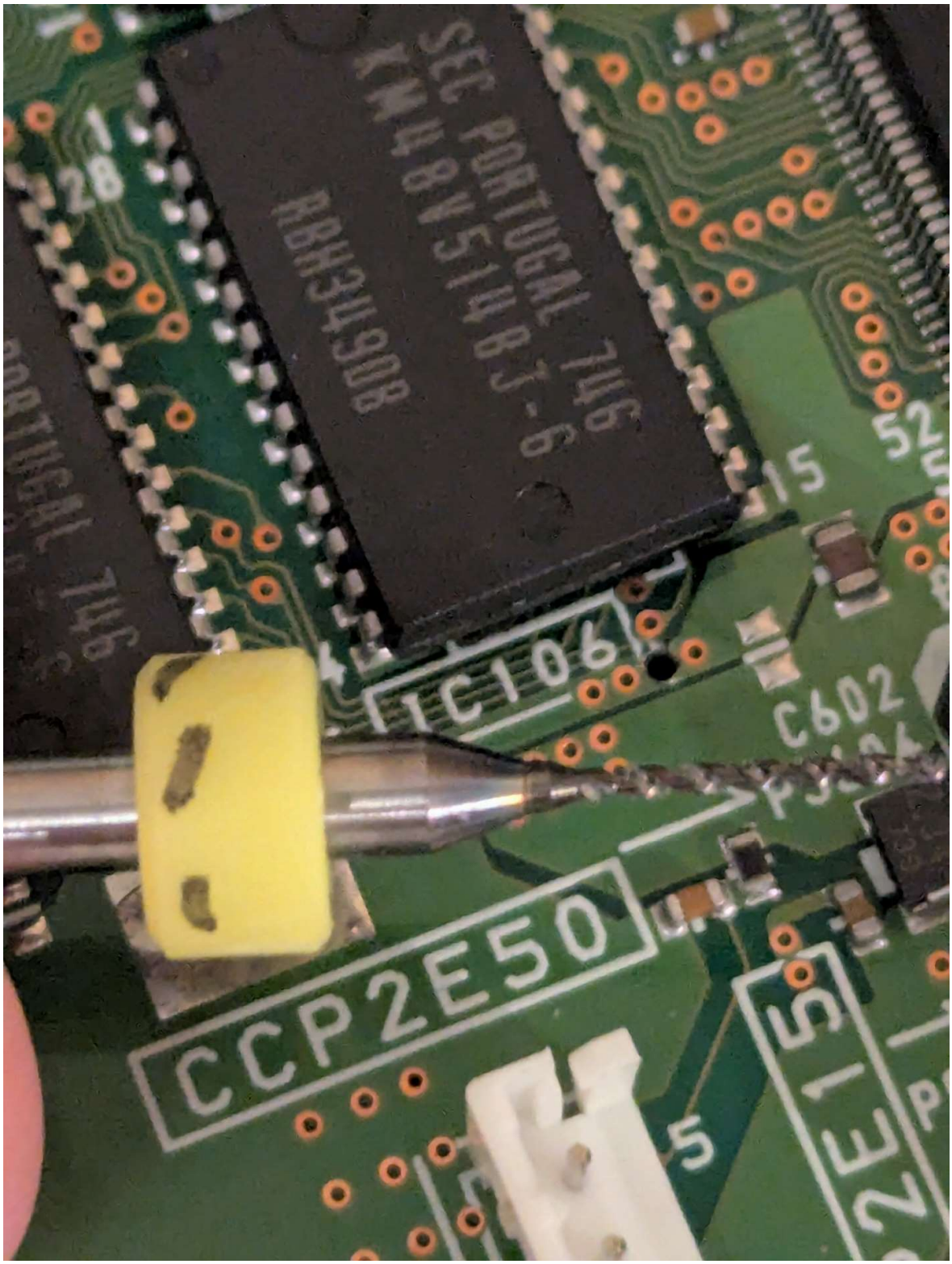
You are going to need:

- 8x Compatible EDO 2MB RAM IC modules.
- 1x 22 ohm resistor.
- Silicone 30awg wire that is 0.8mm outer diameter or smaller.
- Heat shrink.
- 0.8mm PCB drill bit.
- Surface mount soldering skills and soldering supplies.
- UV activated solder mask and a suitable UV torch to cure it.
- Patience.

Let’s get started…

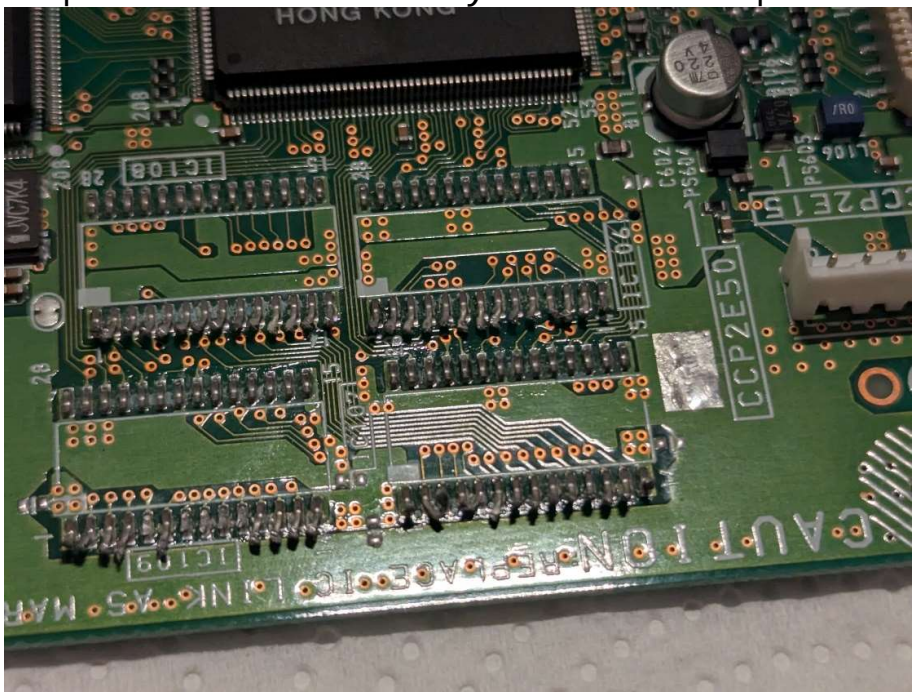
Strip the console down, remove the motherboard, desolder the RF shield and we are first going to drill out and enlarge this particular via out to 0.8mm in order to be able to pass a wire through later on.



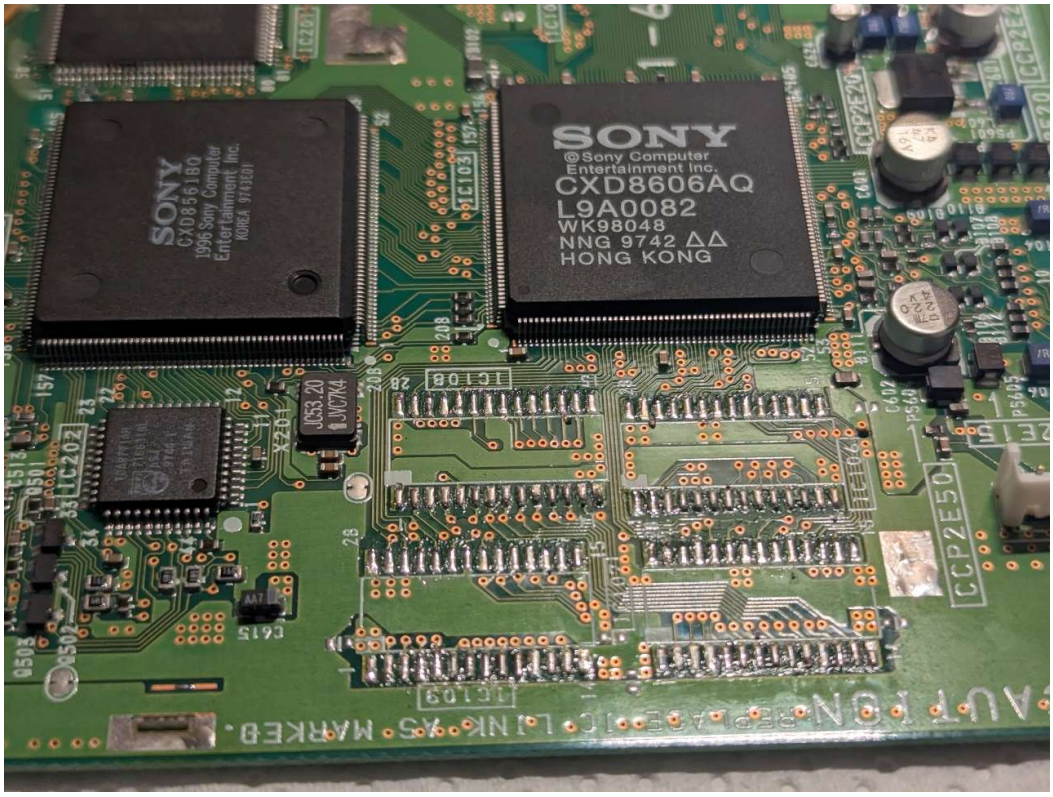


Use the drill bit between your finger and thumb - do NOT use a power drill, finger force is enough because these drill bits are so sharp.

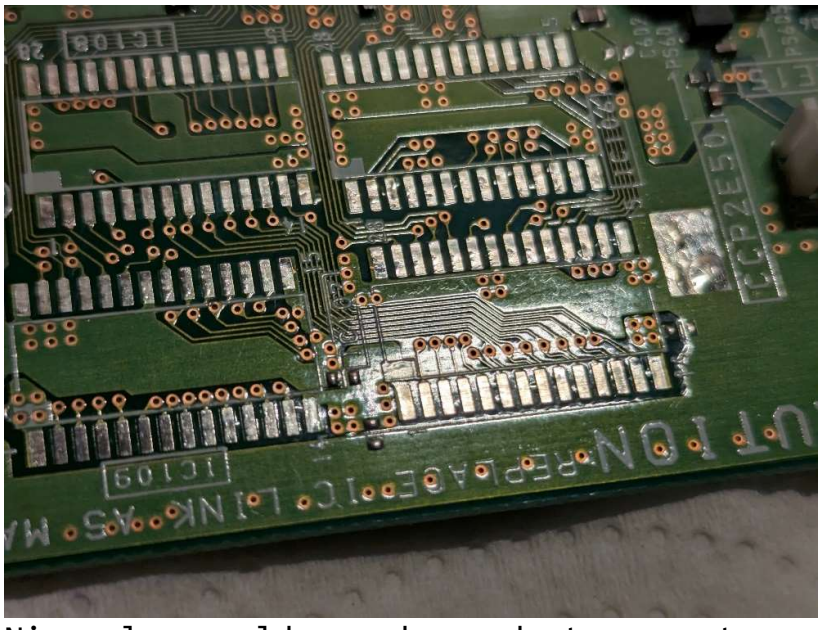
Remove the stock 4x RAM chip IC’s, you can use hot air if you wish to quickly remove them, however in this instance I prefer to use fine tipped cutting pliers and just cut every leg to avoid exposing the board to high temperatures near so many sensitive components.



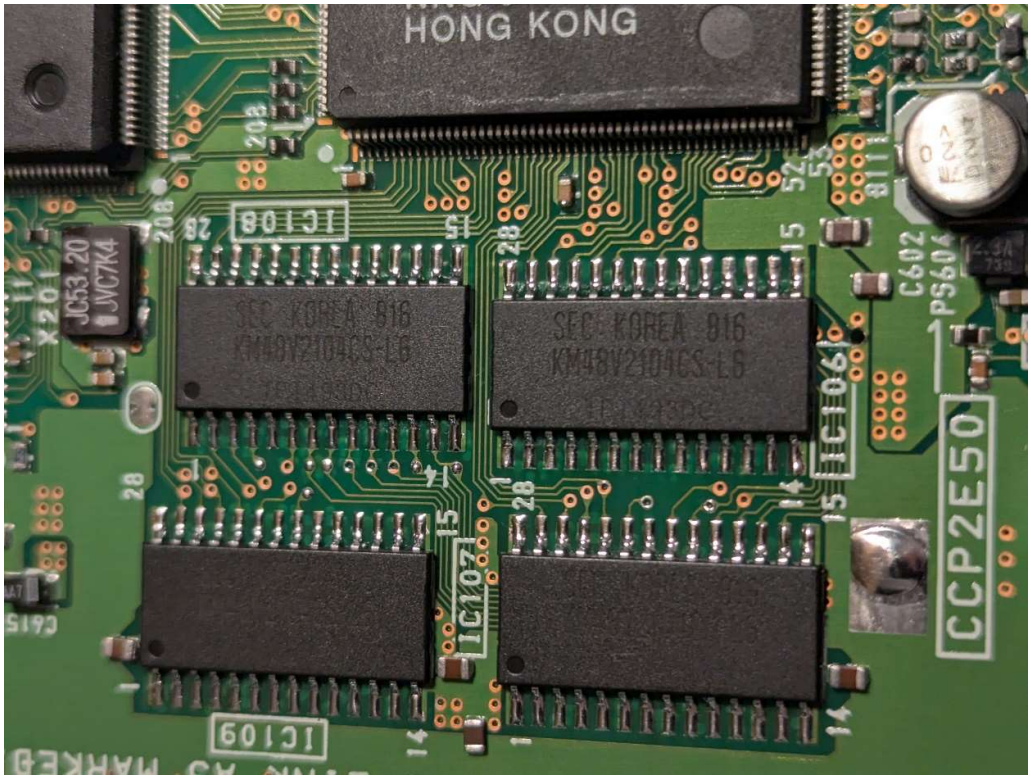
If you remove the chips in the same way as me, you will need to then carefully use a soldering iron to collect the remainder of the legs.



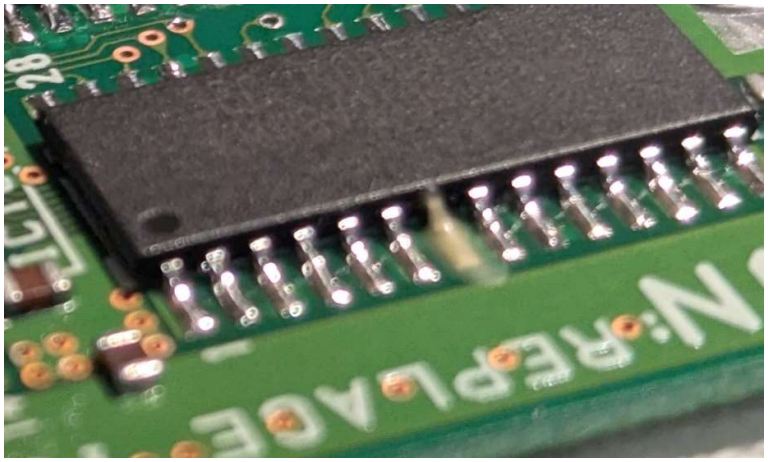
After removal, the solder pads will need the remaining solder to be removed, so go back in with some solder wick/braid and suck all that old metal up!



Nice clean solder pads ready to accept new chips!



Solder on 4 of the replacement upgrade chips, don’t worry too much about the joints being perfect because we are going to be reflowing them shortly anyway, but make sure at least pin number 7 has a very nice connection and is clean.

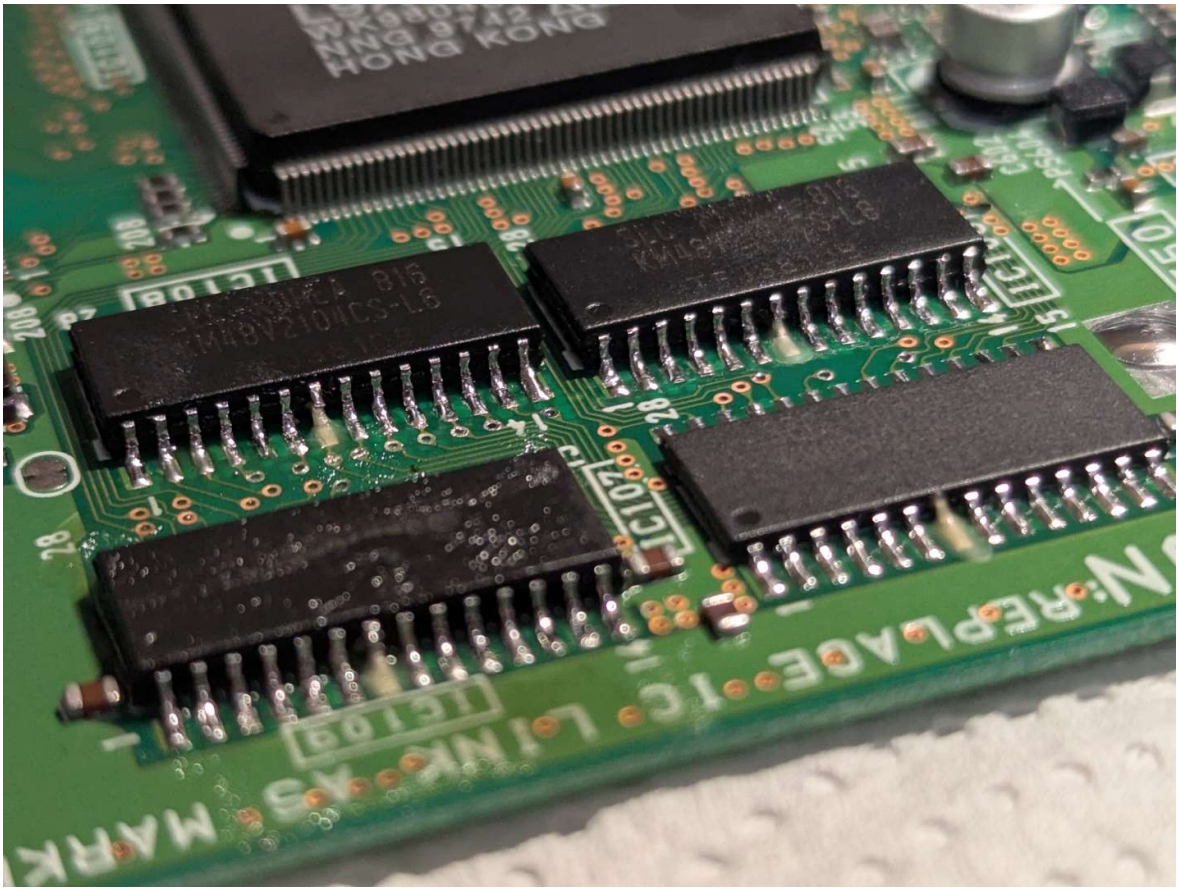


Cover ONLY pin number 7 with UV solder mask.
Cover pin number 7 on each of the 4 installed RAM chip IC’s. Then cure them with the UV torch.

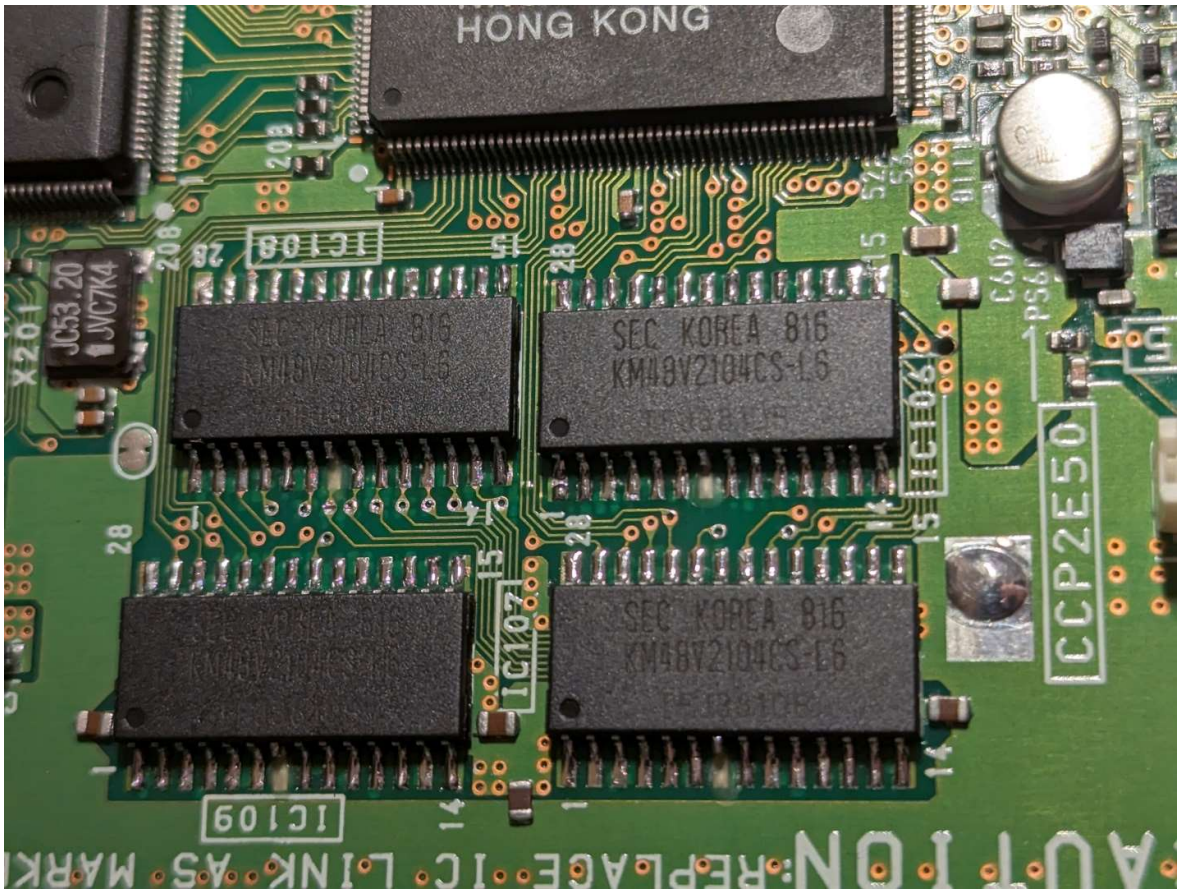
Next it’s time for the double stacking RAM burger, take the 4 RAM chips that we haven’t installed yet and bend the legs at 90 degrees so that they will touch the bottom RAM chip connections, then solder them together.

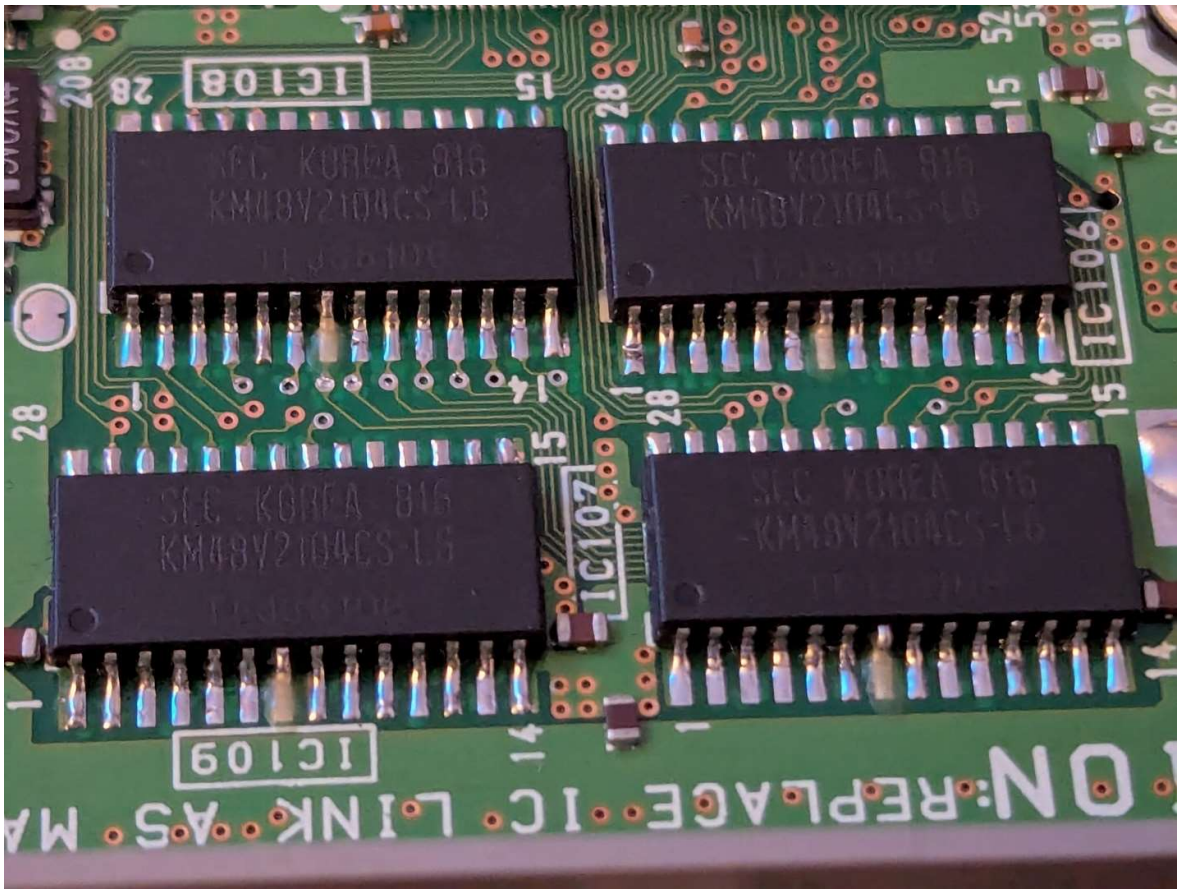
(Do not put as much of a bend on pin 7 we don’t want the 2 sets of chips pin 7 to touch at all)

In the picture below you can see 3 out of 4 of the footprints are now stacked.

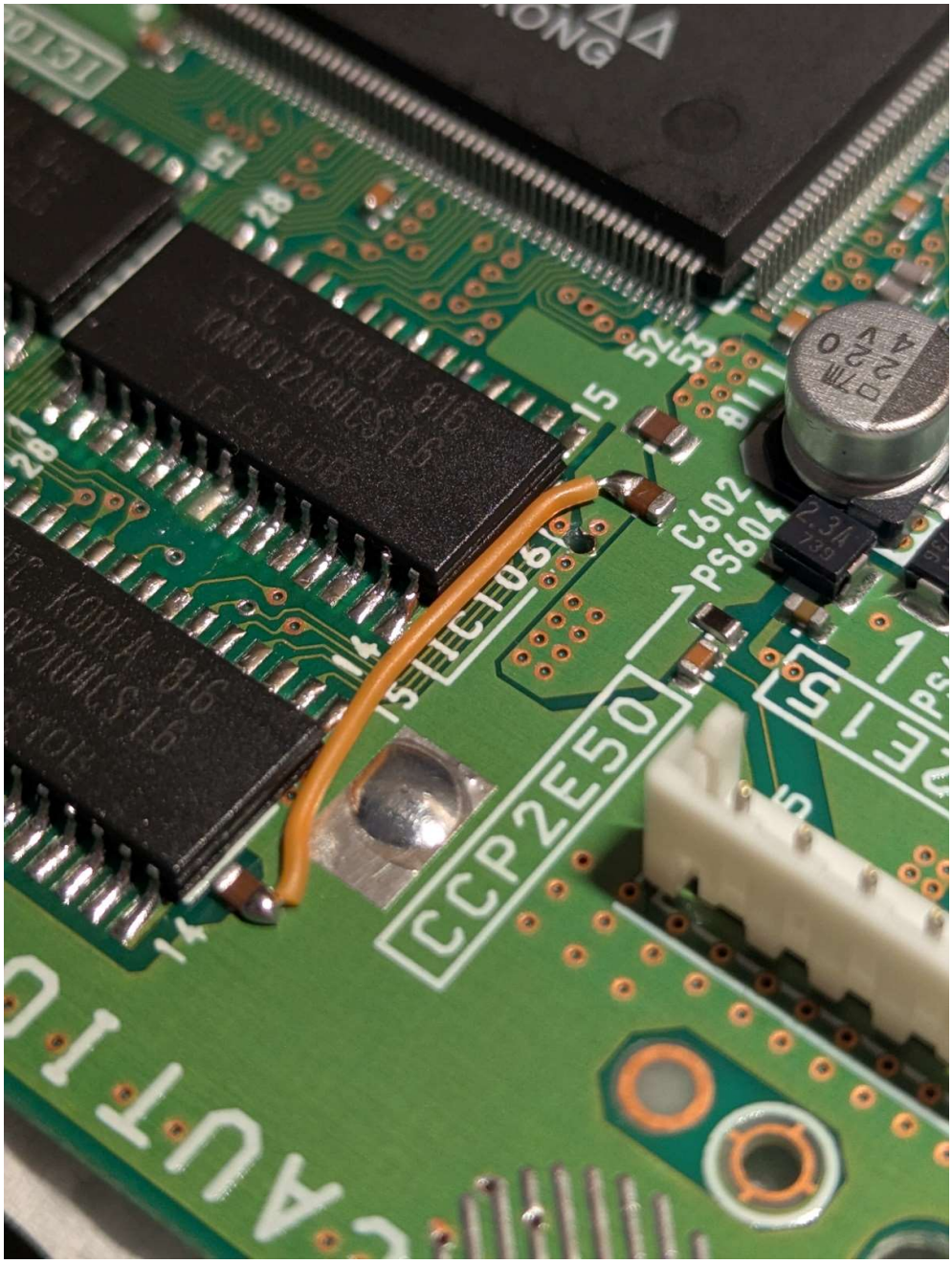


Reflow all the solder connections with plenty of flux, plenty of solder on your iron – rework until all connections look good. Keeping in mind that pin 7 now doesn’t need soldering into the stack and the bottom ‘set’ of chips has its pin 7 protected by solder mask.





RAM Chip stacks installed seen here ^



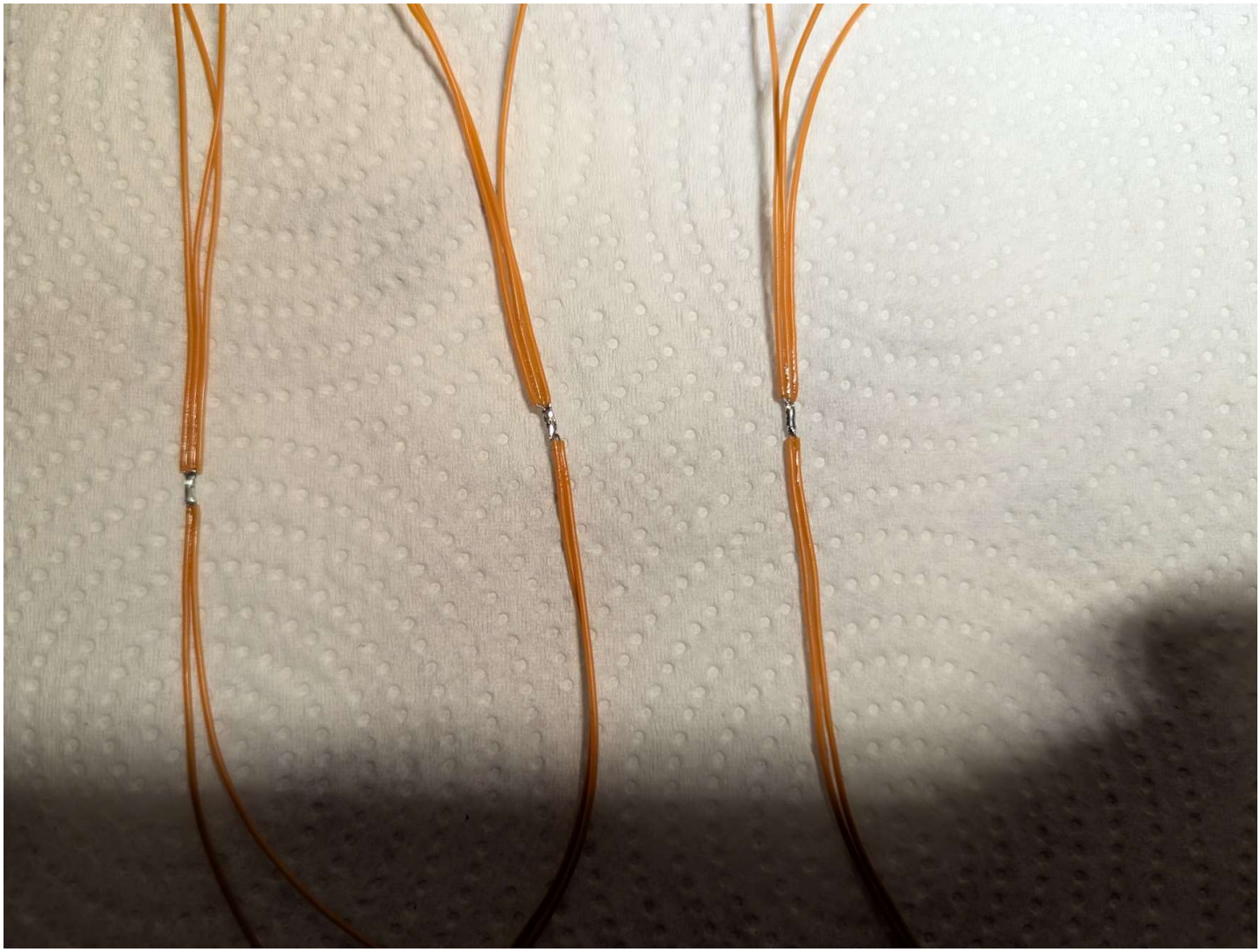
Cut a piece of wire and install it as shown above, from the left side of the top ceramic capacitor connecting to the right side of the bottom capacitor.
This is a precautionary step because drilling into the small ground plane we may have reduced its current capability, performing this fix ensures there is even more current capability than even before.

The capacitors may be missing. Still install the wire.

Now its time to start wiring up the mod so that the PS1 can address the new memory chips and extra memory address space!

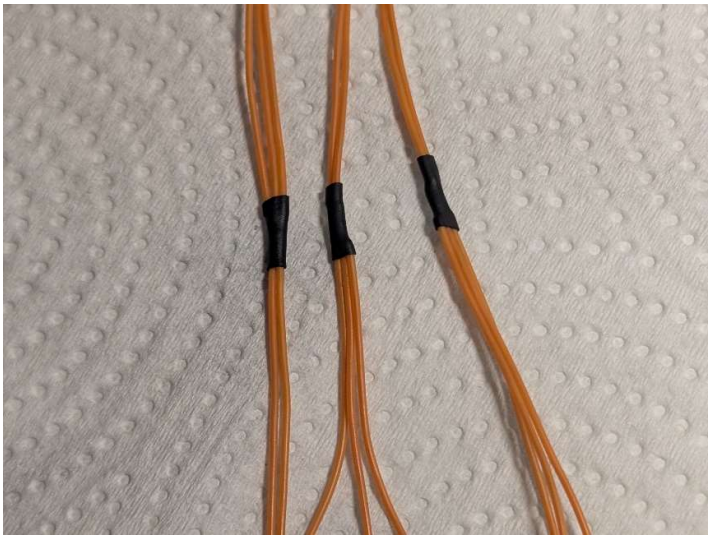
Cut 15 individual pieces of wire, 30awg silicone wire, 0.8mm maximum outer diameter.

Strip and twist together 3x sets of 3 and 3x sets of 2, then solder them together like so:



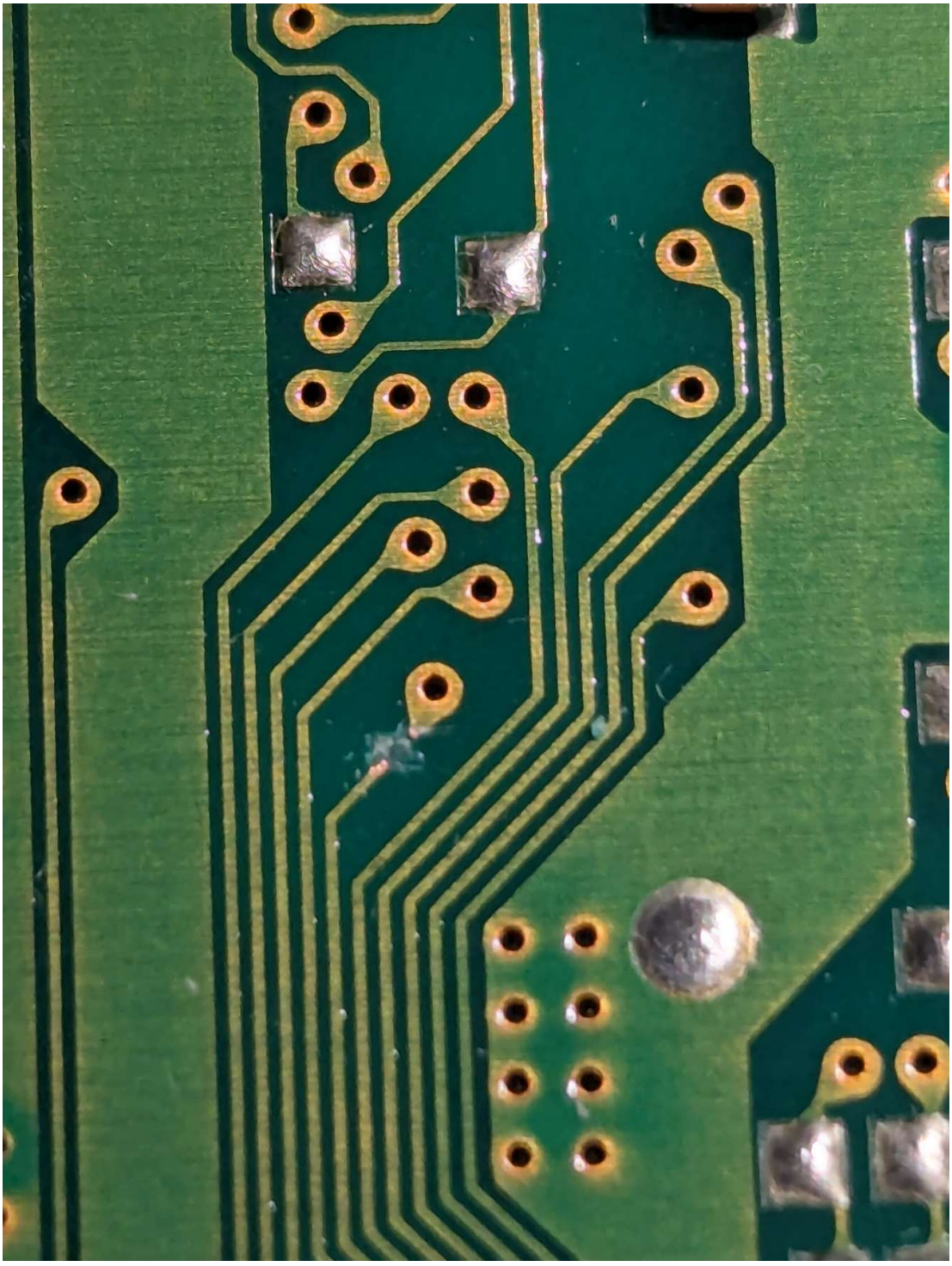
Solder together each set of 3 wires directly to the sets of 2 wires.

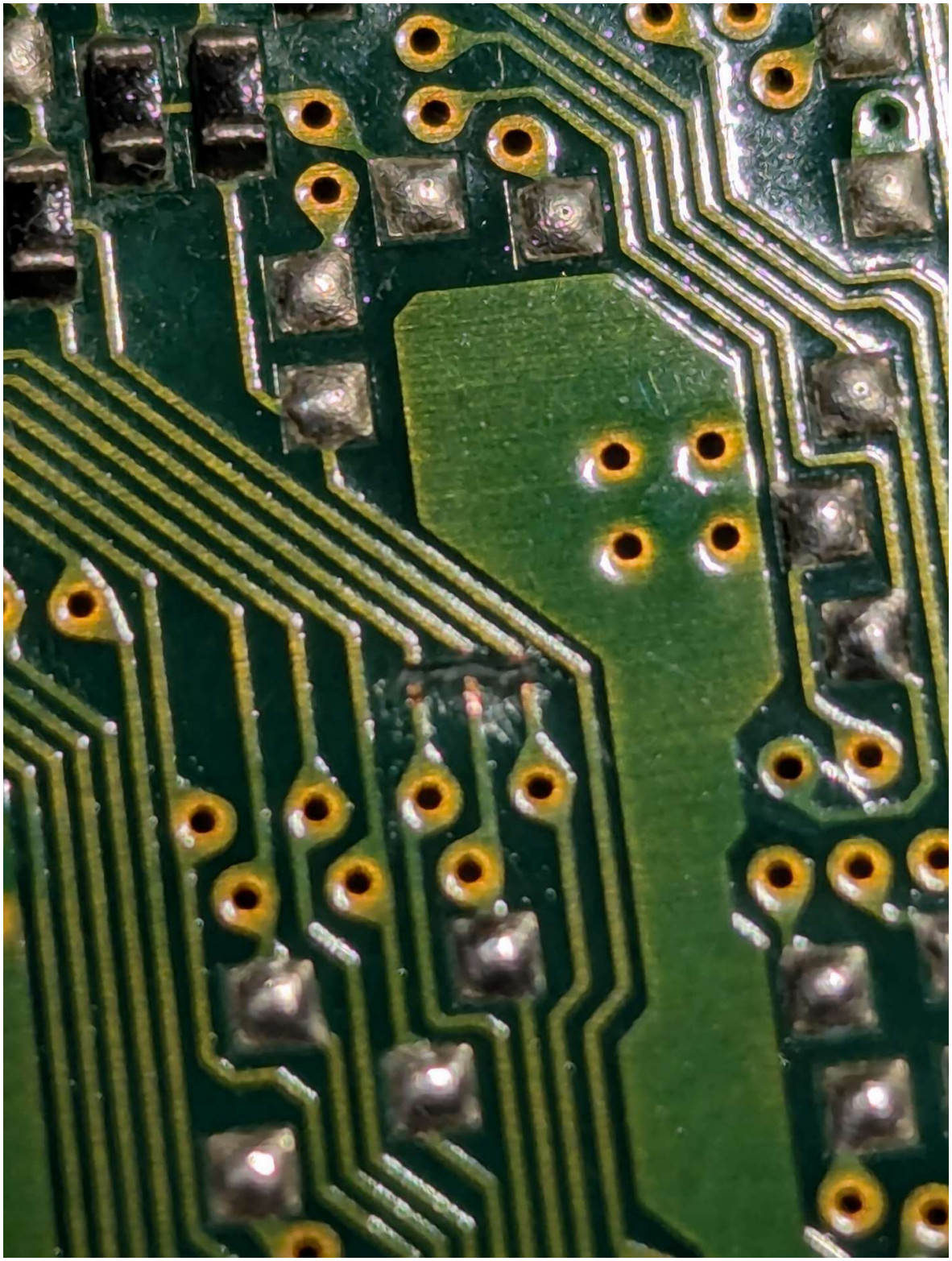
You will end up with 3 pigtails each made of 5 wires, cover the joint with heat shrink as shown. This will make wiring up later much easier.



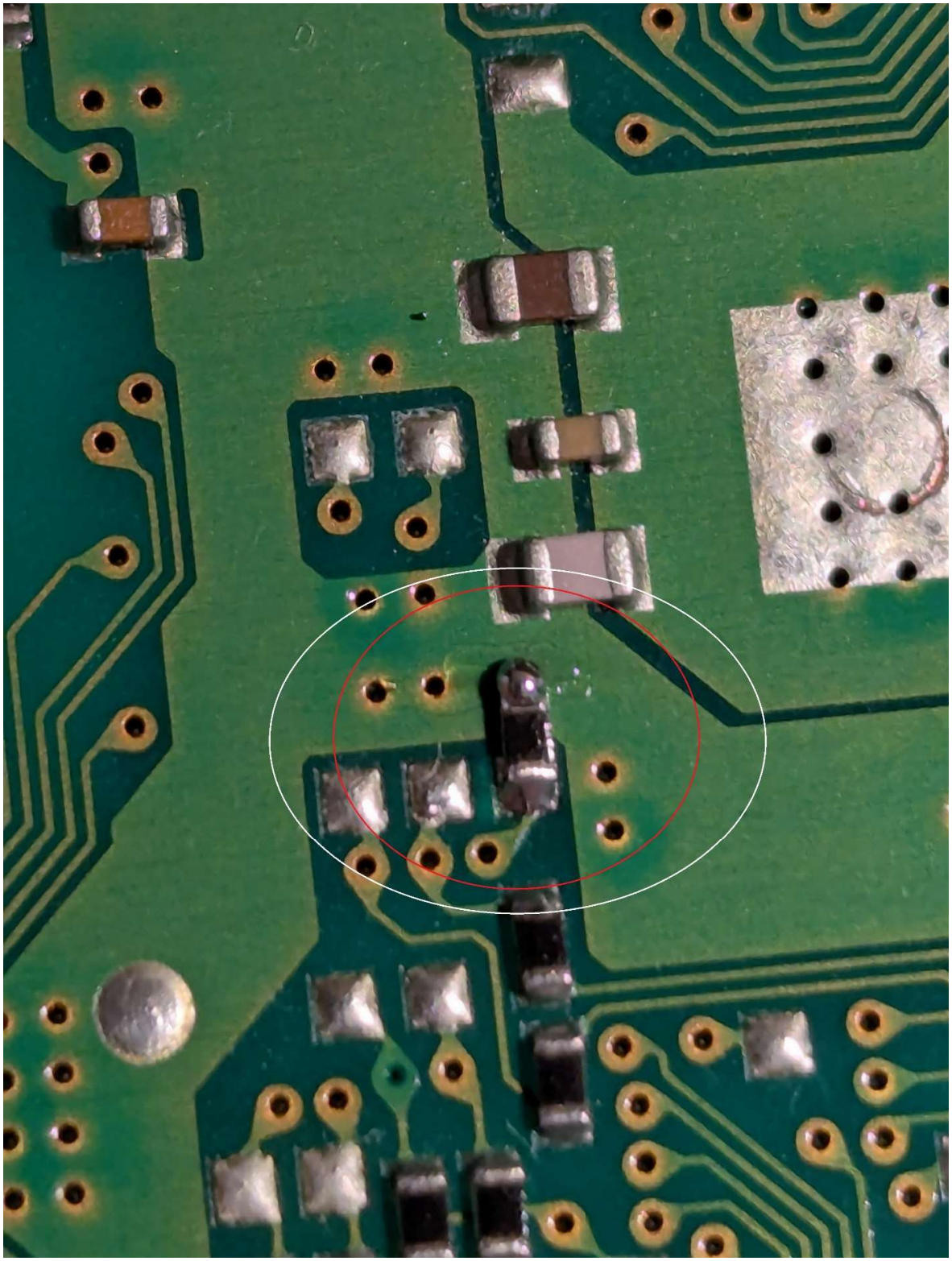
Its now time to **cut** some traces, there are 4 in total to cut, they’re on the bottom side of the motherboard as shown below, make sure they are very clearly cut, no longer making connection and be very careful of the nearby traces to avoid having to make a delicate repair!

I like to use the end of a knife blade and gently take my time to break the trace, the clean with alcohol.

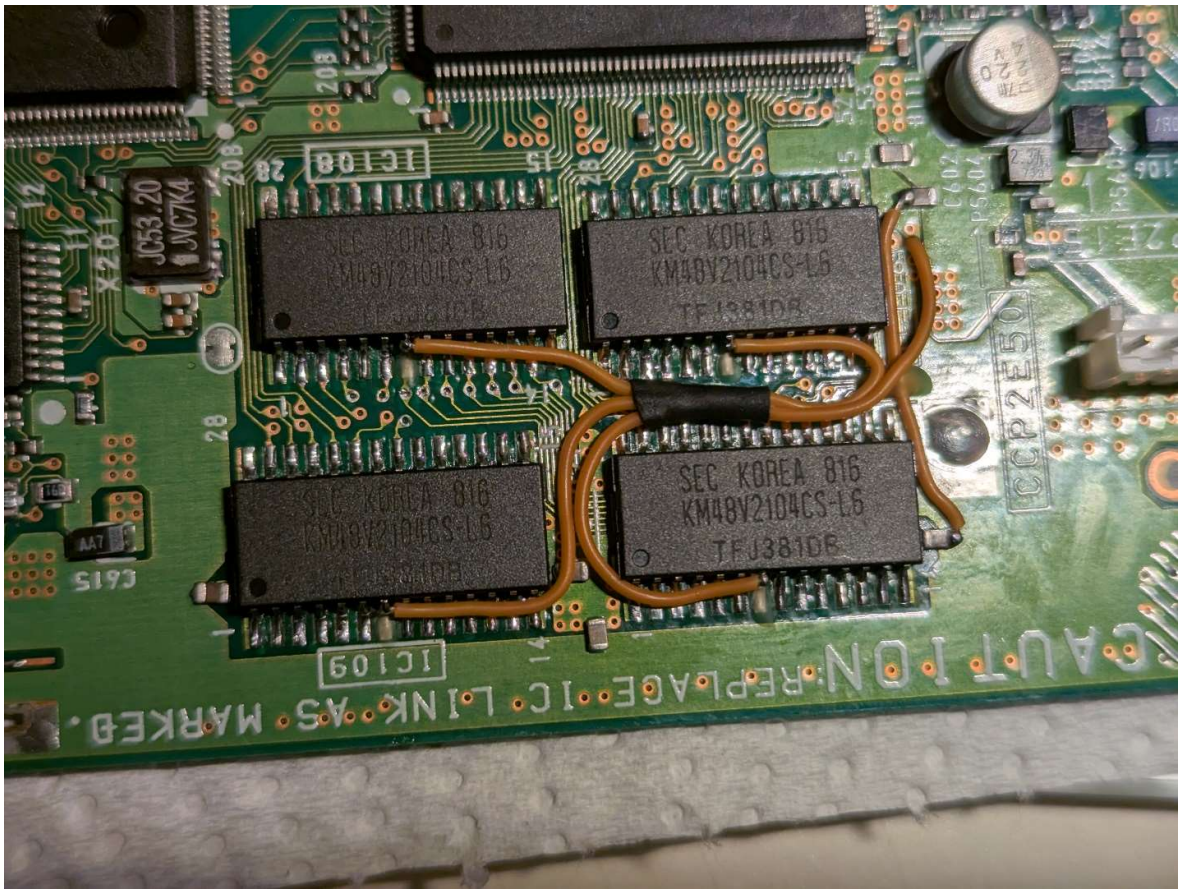




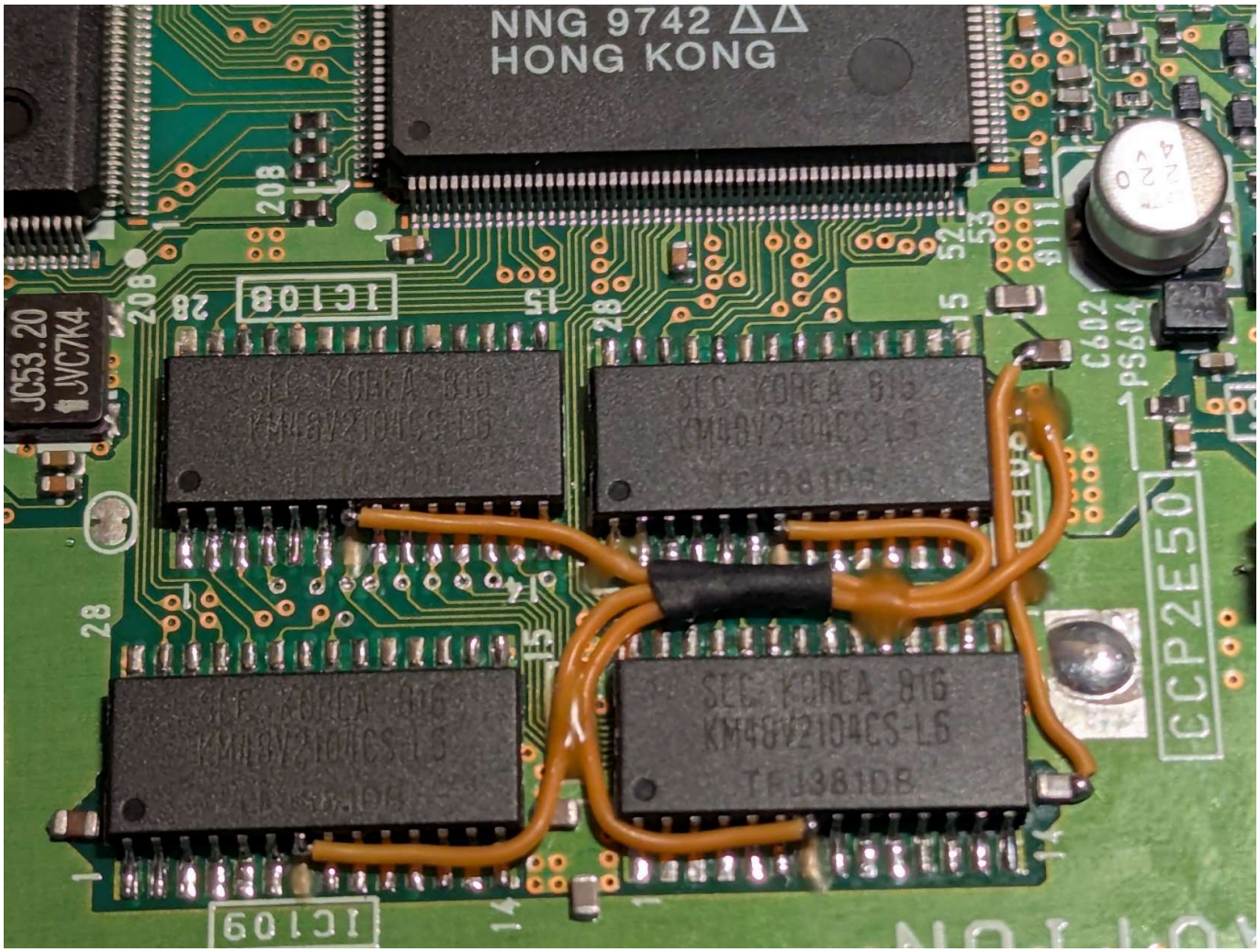
After your precision job of going in and breaking the traces shown above, move on to installing the 22 ohm resistor to the location shown below:



Next, flip back to the top side and install one of the 5-way pigtails we created earlier as shown, 4 of the ends of the pigtail connect to each of the ‘top’ RAM chips pin 7 and the final pigtail end wire goes through the hole drilled at the start…

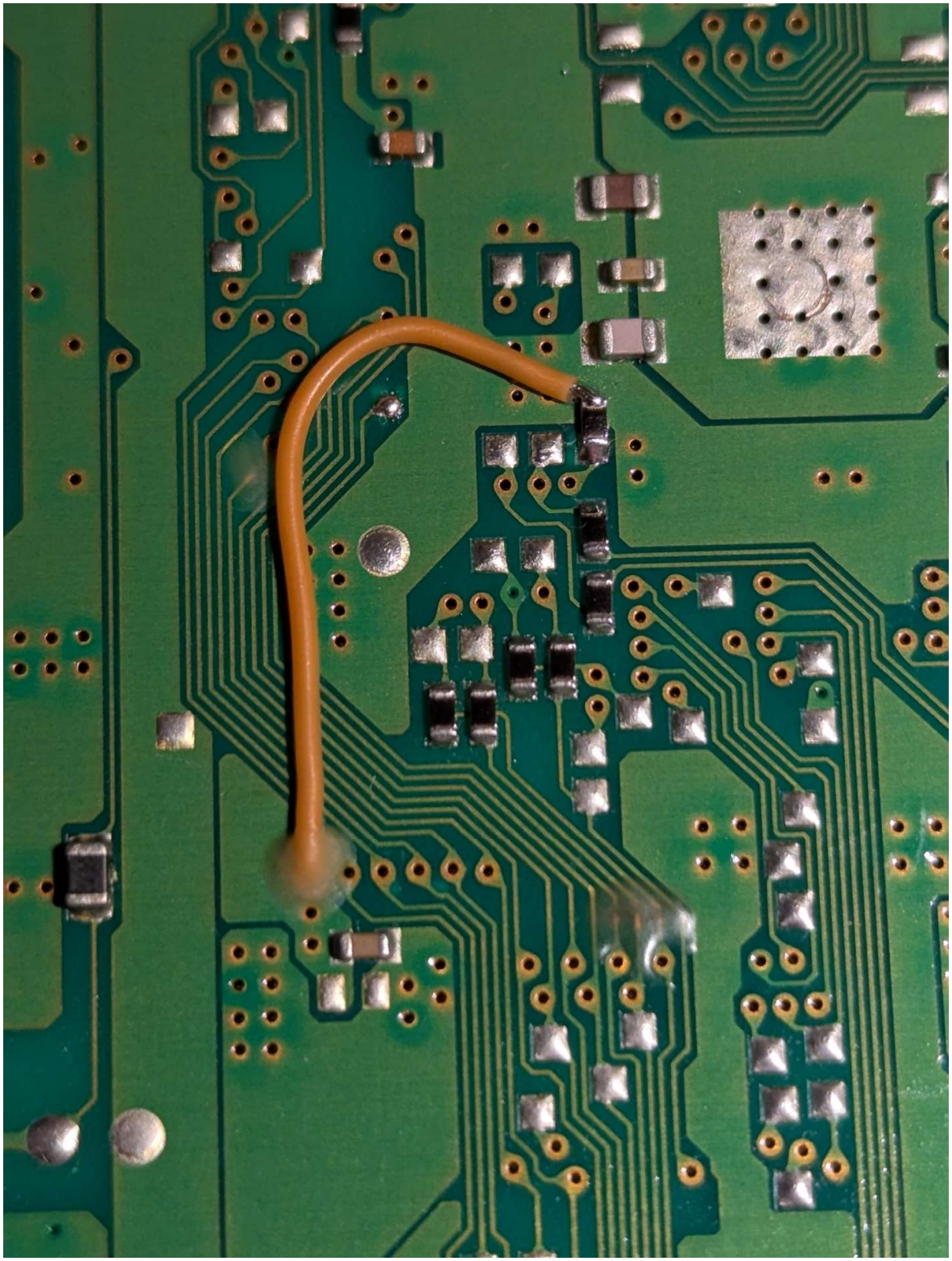


I like to go in after with the UV solder mask and secure down the wires to prevent them moving around too much in future when cleaning etc.

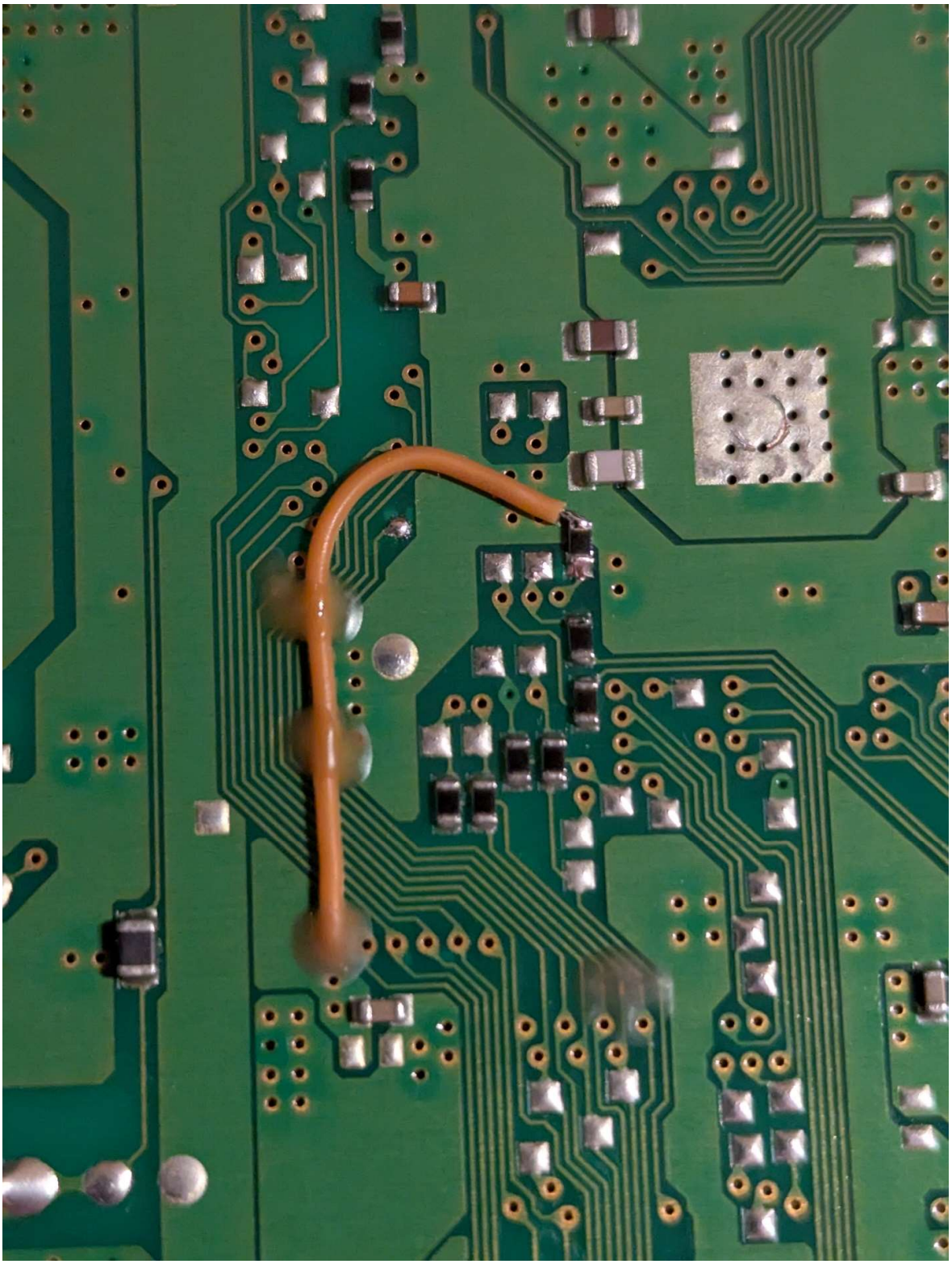


With the wire passed through the drilled hole, flip back to the bottom side, cover the previously cut traces with solder mask and connect the wire to the other side of the 22 ohm resistor we fitted.

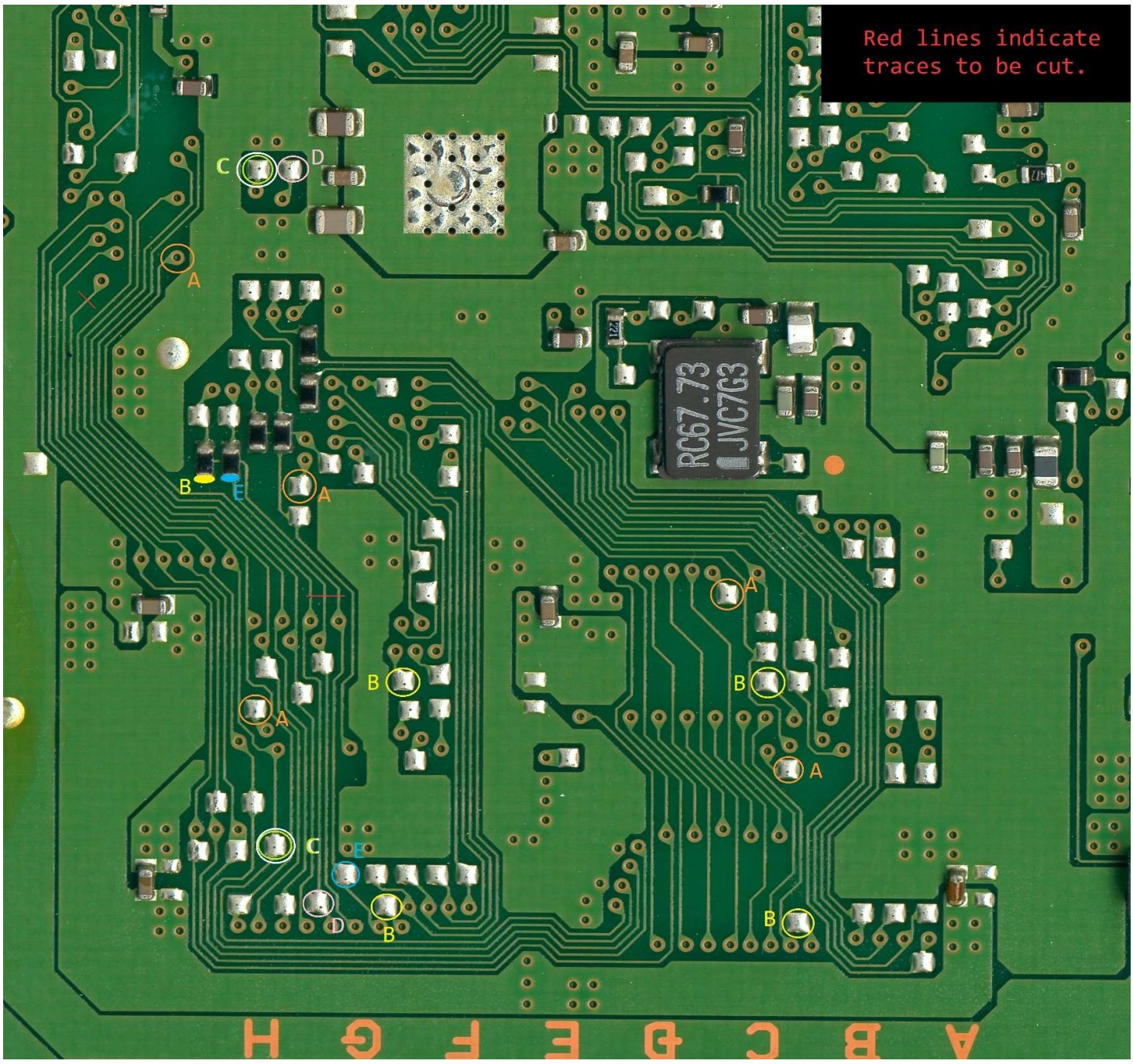
The curve and position of the wire is important, the wire curves around a via, this via requires scraping gently and tinning with solder to be used later.



And again, secured the wire with solder mask to protect and position it correctly.



We’re almost there, here is a diagram for the final sprint of wiring.



Using the diagram:

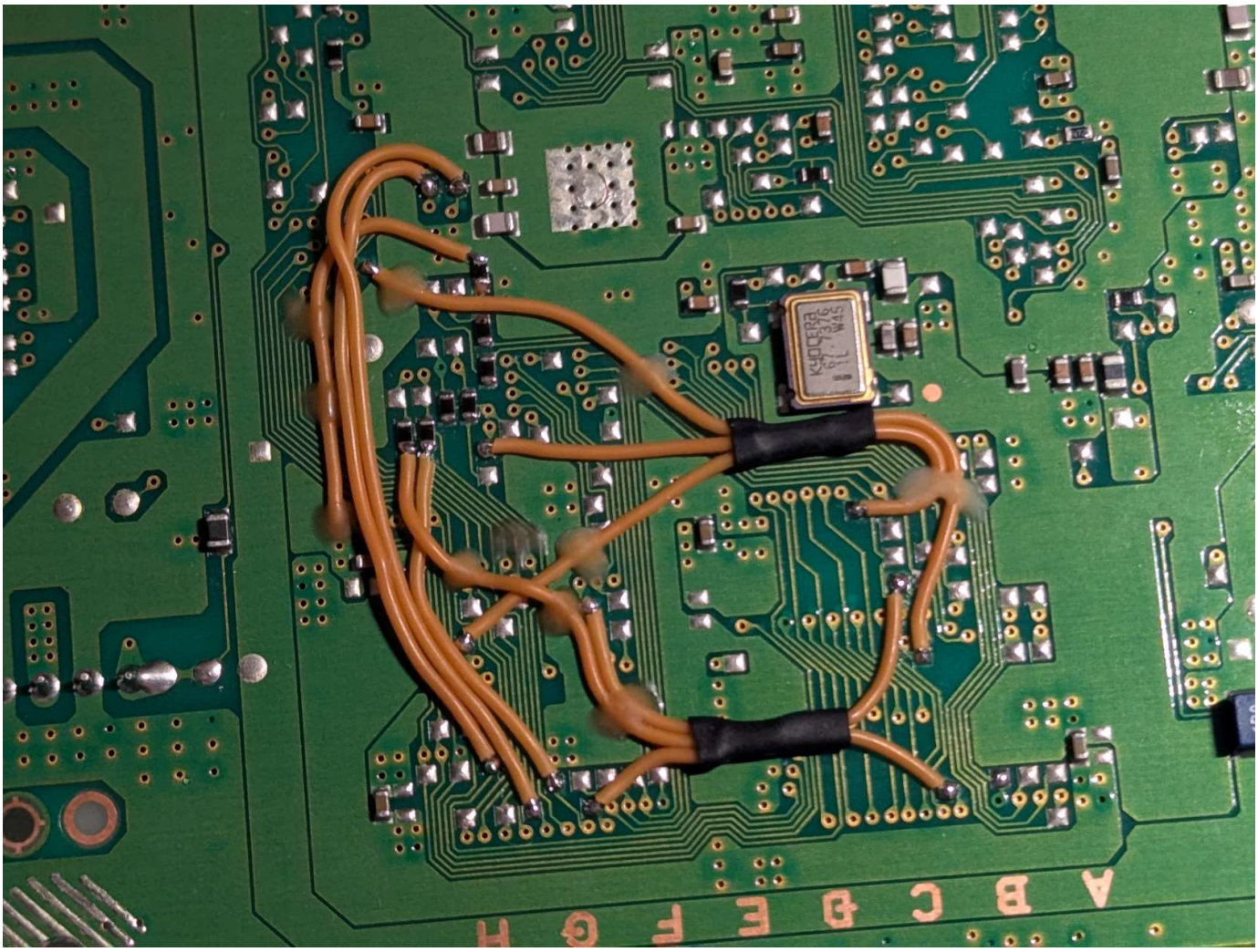
Use a pigtail created earlier to connect all 5 of the A points together.

Use the final pigtail to connect all 5 of the B points together

Connect C to C, connect D to D and connect E to E

Adequately secure down your wires with solder mask should you see fit

And that’s it! – you should have something that looks like the final image below!



SO HOW DOES IT WORK??

Following this tutorial, you are fitting increased capacity RAM chips and then correcting the different connections directly to the CPU to suit them.

They have a different pinout to the stock RAM chips.

By double stacking the RAM chips and connecting them up in this way creates 2 banks of memory, each bank containing 8MB for a total of 16MB!

Enjoy!